

Remarks/Arguments

Examiner Phuong Huynh is thanked for the thorough Office Action.

In the Claims

Claim 1 is amended in steps a), b) and c)(2). Support for this amendment can be found on spec. page 11, lines 17- 20 of the description which indicates that independent variables can be parameters of the test structure such as resistor width. Also see Spec. page 12, lines 24, to page 13, line 8 which describes an example of a testing method with 3 or more test structures with different width and or length for resistive portion.

Claims 2, 3, and 6 are amended to refer from claim 1, step c) to renumbered claim 1, step d).

Claims 1-3, and 6 are amended to correct minor informalities as kindly noted by the examiner.

Claim 1, at former line 7, is amended before "processes" to delete "the" for proper antecedent basis.

Claim 2 at line 3, are amended -- "devices" changed to --device-- for proper antecedent basis.

Claims 3, and 6, at line 4, are amended for proper antecedent basis -- "devices" changed to --device--.

Claim 6, at line 2, is amended -- before "using", delete "and".

Claim 7, steps a) (3) and d) are amended to provide more exact antecedent basis. Claim 7, steps a)(3) and c)(1) are amended to provide better grammar for plurals. Claim 7, step c)(2) is amended to provide proper antecedent basis to refer to the effective widths resistive portions. For support, see claim 7, steps (a) (1) and (2).

Claim 11 is canceled to reduce prosecution costs and is canceled without prejudice.

Claim 16 is amended for grammatical purposes. Claim 16 is also amended to provide proper antecedent basis for "process".

Claim 17 is amended for grammatical purposes and to provide proper antecedent basis.

Claim 18 is amended to provide proper antecedent basis for "goodness of fit value".

Claim 19 is amended to provide proper antecedent basis.

Claim 20 is amended to for grammatical purposes.

Claim 21, preamble is amended to be consistent with the claim, resistance is measured. For support see claim 21, step c). Claim 21, steps c), d) and e) are amended to provide proper grammar.

Claim 21, steps a) and b) are amended for antecedent basis to refer to "processes". For support see claim 21, step f).

Claim 23, step d) and claim 25, step d) are amended to provide proper antecedent basis to "device structure" in step a.

Claim 25, steps c (1) (20 and (3) are amended to change "a" to --the-- for grammatical purposes.

Claim 27 is amended for grammatical purposes.

Claims 28 and 29 are canceled to reduce prosecution costs and are canceled without prejudice.

Claims 31 and 32 are amended to add "wherein" for grammatical purposes.

New claims 32 and 33 are added. Support for these amendments can be found on spec. page 23, lines 6 to 15.

New claim 34 is added. For support see for example, spec. page 11, lines 17-20, and spec. page 23, lines 6-15.

Entry of the amendments is requested. No new matter is believed to be added.

Objections to Claims 1-3, 6, 28 and 29

The objections to the claims are acknowledged. Claims 28 and 29 are canceled. The objection to Claim 23, that stated "claim 23, at line 4, "devices" should be --device--" may be inaccurate. Claim 23 does not appear to contain "devices". Clarification is

respectfully requested. Claim 23 was amended to change "device structure" to --device structures--.

The claims were amended as kindly suggested by the examiner.

35 USC 102 Rejections

Rejection of Claims 1-6, 28, 29 and 31 under 35 U.S.C. 102(b) as being anticipated by Borden et al. (hereinafter "Borden") (US Patent No. 6,049,220).

The rejection of Claims 1-6, 28, 29 and 31 under 35 U.S.C. 102(b) as being anticipated by Borden et al. (hereinafter "Borden") (US Patent No. 6,049,220) is acknowledged. Reconsideration and withdrawal of the rejection is respectfully requested in view of the amendments and remarks.

Amended claim 1 states:

1. (CURRENTLY AMENDED) A test method comprising:
 - a) providing a first, second and third test structure each having a respective first, second and third test structure parameter;
 - b) obtaining from each of the first, second and third test structure at least one test measurement value, the test measurement values varying based on the first, second and third test structure parameter;
 - c) calculating a goodness of fit value for a fitted curve between :
 - (1) said test measurement values; and
 - (2) values of the first, second and third test structure parameter;
 - d) using said goodness of fit value to monitor processes used to form a device.

Amended claim 1, steps a) and b), do not appear to be shown or suggested by the cited section of Borden, col. 18, line 61-col. 19, line 21. Borden does not appear so disclose or suggest claim 1, steps a) or b)

"a) providing a first, second and third test structure each having a respective first, second and third test structure parameter;
b) obtaining from each of the first, second and third test structure at least one test measurement value, the test measurement values varying based on the first, second and third test structure parameter;--"

For at least this reason amended claim 1 is believed to be patentable over Borden.

Amended claim 1, step c) is not shown or suggested by Borden

The limitation of amended claim 1, step c), does not appear to be shown or suggested by the cited sections of Borden: col. 18, line 61-col. 19, line 21 and lines 38-50.

Borden: col. 18, line 61-col. 19, line 21 and lines 38-50 states the following.

Instead of plotting a graph to be manually checked, the reflectance measurements are checked automatically in another implementation, using statistical process control methods as described above. also, each reflectance measurement obtained by act 243 (FIG. 2A) provides an indication of a material property (e.g. the mobility of charge carriers) in wafer 105/106 (FIG. 1A). Specifically, profiler 103 is programmed to obtain a number of measurements (in at least one region 301) that are used (as described below in reference to FIGS. 5A-5H) to calibrate a measurement with respect to the material property (e.g. obtain a scaling factor to convert a reflectance measurement into doping concentration or a slope from a number of measurements into mobility).

In one implementation, profiler 103 performs a group of measurements (e.g. at least two measurements for two different powers of generation beam 151) in each region of wafer 105/106. Therefore in the just-described embodiment, profiler 103 functions as a scanning mobility microscope that displays on monitor 103M the mobility of various regions on wafer 104/105/106, and can be used in a manner similar to the use of a scanning electron microscope. In one example, four hundred measurements are taken in an area of 100 .mu.m.times.100 .mu.m and displayed in a three dimensional graph wherein the x and y axes define, in the two dimensions, a region on patterned wafer 105, and the hatch pattern (that is displayed on monitor 103M in a third dimension) indicates the measured reflectance.

Borden: col. 19, lines 38-50 states the following.

In one embodiment, the above-described intensity measurement obtained in act 243 is used directly to detect electrically active defects that could lie at various depths d near (e.g. within 1-2 .mu.m) surface 153 (FIG. 1C) in wafer 105. Specifically variations in intensity measurements across a wafer 105/106 are detected by changing (as illustrated by act 247 in FIG. 2A) the region 130 illuminated by beams 151 and 152, and repeating the measurement in the new region. Note that beams 151 and 152 remain coincident (as illustrated in FIG. 1C and unlike FIG. 1D) when focused on the new region.

The representative could not find in the cited sections of Borden or in the figures where the claim 1, step c "goodness of fit value", such as a correlation coefficient, was disclosed. For example, Borden figure 4A and 4b calculate/show a "coefficient of a function that defines a fitted line". Borden's coefficient of a fitted line is the slope of the line(s) shown in Borden figure 4B. However, this is not the claim 1's step c)'s calculating a **goodness of fit value** for a fitted curve between : (1) said test measurement values; and (2) values of the first, second and third test structure parameter; "

In addition, Borden does not make any suggestion to meet applicant's claim 1. Borden does attempt to solve similar problems are the applicant.

Amended claim 1, step d

Applicant's amended claim 1, step d, does not appear to be shown by the cited section of Borden, col. 20, line 50-col. 21, line 4; and col. 8, lines 12-32. The cited sections refer to "coefficients" that are coefficients of the fitted curve, not the claim 1's goodness of fit values. For example see Borden, col. 20, lines 64 to p. 21, line 1 that states the coefficient are slope and intercepts;

"In one implementation, the properties and process conditions of wafers represented by lines 501, 502 and 503 are plotted as functions of one or more of the above-described coefficients, e.g. high power intercept Y_H and low power slope m_L as illustrated by FIGS. 5B, 5C, 5D and 5E. Thereafter, the corresponding coefficients of line 502 are used to look up the respective properties and/or processing conditions."

For further support that Borden does appear to calculate good of fit values, see Borden col. 21, line 2 to col. 21, line 20, see figures 4A, 4B, 5A to 5G.

Applicant's posit that amended claim 1 distinguishes over the cited references for the reasons stated above, and that:

"Anticipation requires the presence in a single prior reference disclosure of each and every element of the claimed invention, arranged as in the claim." Lindernann Maschinenfabrik GmbH v. American Hoist & Derrick Co., 730 F.2d 1452, 221 USPQ 481, 485 (Fed. Cir. 1984) (citing Connell v. Sears, Roebuck & Co., 722 F.2d 1542, 220 USPQ 193 (Fed. Cir. 1983)). (emphasis added).

Withdrawal of the rejection is respectfully requested for the reasons set forth above and of Lindemann Maschinenfabrik GmbH, supra.

Claim 2 is patentable

With respect to claim 2, the Office action states:

Regarding claim 2, Borden discloses wherein step (c) further includes using control limits on the goodness of fit values; using said goodness of fit value to (1) control the processes used to form said device or (2) or screen the device [see Borden: col. 17, lines 52-65 and col. 16, lines 3-20 and lines 49-67].

The reference does not anticipate, as the reference fails to show the Claim 2 limitations "d) further includes using control limits on the goodness of fit value and using said goodness of fit value to: (1) control the processes used to form the device or (2) screen the device."

As discussed above with respect to claim 1, Borden does not appear to calculate a goodness of fit value. In contrast, Borden calculates a fitted curve and the coefficients of the fitted curve. See Borden col. 18, line 61-col. 19, line 21 and lines 38-50. Borden: col. 18, line 61-col. 19, line 21 and lines 38-50. The cited section of Borden col. 17, lines 52-65, and col. 16, lines 3-20 and lines 49-67; do not appear to suggest claim 2 limitations. See Borden figure 3A discussed in col. 16, lines 3-20 that does not appear to disclose applicant's claim 1 and 2's "goodness of fit value". Therefore claim 2 is believed to be patentable.

Claim 3 is patentable

Claim 3 depends from claim 1 and is non-obvious for at least the reasons discussed above with respect to claims 1 and 2.

Claim 4 is patentable

Claim 4 depends from claim 1 and is non-obvious for at least the reasons discussed above with respect to claim 1. The Office action states:

Regarding claim 4, Borden discloses the goodness of fit value is a correlation coefficient or a standard error measurement [see Borden: col. 18, lines 31-44].

However, it appears that Borden col. 18, lines 31-44 does not meet claims 1, steps b and c) or claim 4 since Borden appears only to calculate the standard deviation of one measurement (not the goodness of fit of a curve between at least two variables). Therefore Borden does not meet claim 4's limitations.

Claim 5 is patentable

Claim 5 depends from claim 1 and is non-obvious for at least the reasons discussed above with respect to claim 1.

Claim 6 is patentable

Claim 6 depends from claim 1 and is non-obvious for at least the reasons discussed above with respect to claim 1.

Claim 31 is patentable

Claim 31 depends from claim 1 and is non-obvious for at least the reasons discussed above with respect to claim 1. See Borden col. 18, line 61-col. 19, line 21 and lines 38-50.

Withdrawal of the rejection of claims 1-6, and 31 is respectfully requested because of the arguments above and because of Lindemann Maschinenfabrik GmbH, supra.

Applicant submits claims 1-6, and 31 are allowable as not anticipated by Borden. Withdrawal of these rejections and allowance of the claims are hereby solicited.

Rejection of claim 30 under 35 U.S.C. 103(a) as being unpatentable over Borden et al. (hereinafter "Borden") (US Patent No. 6,049,220) in view of Peng et al. (hereinafter "Peng") (US Patent No. 5,787,190).

The rejection of claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Borden et al. (hereinafter "Borden") (US Patent No. 6,049,220) in view of Peng et al. (hereinafter "Peng") (US Patent No. 5,787,190) is acknowledged.

Claim 30 depends from claim 1 and is non-obvious for at least the reasons discussed above with respect to claim 1. Withdrawal of this rejection and allowance of the claim are hereby solicited.

New claims 32, 33 and 34 are patentable

New claims 32, 33 and 34 state:

32. (NEW) The method of claim 1 wherein the first, second and third test structure parameter comprises at least one of length or width of a resistive portion of the respective first, second and third test structure.

33. (NEW) The method of claim 1 wherein the first, second and third test structure parameter comprises an area of a capacitive portion of the respective first, second and third test structure.

34. (NEW) The method of claim 1 wherein the test measurement values comprises resistance or capacitance.

New claims 32, 33 and 34 depend from claim 1 and are non-obvious for at least the reasons discussed above with respect to claim 1. New claims 32, 33 and 34 contain further non-obvious limitations not suggested by Borden. Claims 32, 33 and 34 are believed to be patentable.

Allowable claims

The allowance of claims 7-10 and 12-27 are gratefully acknowledged.

All Pending Claims Addressed

It is believed that all the pending claims have been addressed. However, the absence of a reply to a specific rejection, issue or comment does not signify agreement with or concession of that rejection, issue or comment. In addition, because the arguments made above

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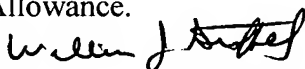
Reply to the Office action dated 2007-04-12

- may not be exhaustive, there may be reasons for patentability of any or all pending claims (or other claims) that have not been expressed. Finally, nothing in this paper should be construed as an intent to concede any issue with regard to any claim, except as specifically stated in this paper and the amendment of any claim does not necessarily signify concession of the unpatentability of the claim prior to its amendment.

CONCLUSION

In conclusion, reconsideration and withdrawal of the rejections are respectfully requested. Allowance of all claims is requested. Issuance of the application is requested.

It is requested that the Examiner telephone the undersigned attorney at (215) 670-2455 should there be anyway that we could help to place this Application in condition for Allowance.



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